Isolation and heterocyclic compounds degradation of Antarctic psychrophilic bacteria strain BS19

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Contamination of soil or sea from oil and related compounds is a serious environmental problem. Oil contains heterocyclic compounds such as carbazole (CAR), dibenzothiophene (DBT) and dibenzofuran (DBF). These are persistent and harmful for the ecosystems. Bioremediation has the potential to detoxify contaminants, while being low cost and with low environmental impact. These are numerous reports on bioremediation of CAR in general, but very few involving cold-adapt bacteria. Polar regions such as Antarctic have very low temperatures. Antarctic psychrophilic bacteria have potential to degrade contaminants at low temperature and is very promising for development of bioremediation for cold climates.

In this study, psychrophilic six strains of bacteria were isolated from soil samples from King George Island, Antarctica. Enriched culture medium used MSM contains 0.1% CAR as the sole source of carbon and nitrogen was used. One of six strains was identified as *Pseudomonas* sp. strain BS19 by 16S rRNA analysis. Ability of CAR degradation by strain BS19 was analyzed at 15℃ and 100 rpm in rotary shaker. Residual CAR concentrations were analyzed by GC-FID. As a result, BS19 can degrade CAR well at low temperature. For BS19 characterization study, growth temperature at 5, 10, 15, 20, 25, 30, 35, 40, 45℃ in 72h were tested. Strain BS19 grew at 10 to 35℃, while showed lowered growth rate at 5℃. This study suggested that BS19 has good potential to degrade CAR at low temperature. Further study on this strain is required for further development of bioremediation solution for cold environments.